

# Exploration on the Curriculum System and Mode of Innovative Talents Training in Big Data Specialty Based on AI Concept

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**Abstract**—The rapid development of big data and cloud computing technology, artificial intelligence (Artificial Intelligence, AI) technology, and wireless sensor technology provides support for the digital transformation of various industries and industrial economies in society, and also puts forward the comprehensive quality of big data professionals. Higher requirements. Starting from the “AI concept” of the integration and development of “big data + artificial intelligence”, this paper explores the problems of unclear educational objectives, imperfect teaching system, outdated teaching knowledge content and insufficient innovation of teaching mode in the current big data professional courses in colleges and universities, and puts forward the “1 + X” open teaching system with big data professional teaching materials as the main part and other subject teaching as the supplement, the establishment of network Massive Open Online Course (MOOC) platform, school-enterprise integration practice training base to deepen the orientation education of big data professional students, the formation of big data curriculum theory, employment application practice integration teaching mode, so as to achieve the goal of comprehensive application ability training of big data professionals.

**Keywords**—professional courses of big data, AI concept, cultivation of innovative talents, education mode

## I. INTRODUCTION

Since the Fifth Plenary Session of the 18th CPC Central Committee first proposed the “National Big Data Strategy” in 2015, the Ministry of Industry and Information Technology released the “14th Five-Year Plan” Big Data Industry Development Plan in 2021, and the Big Data Branch of the China Information Association and the Beijing Guorun Internet Information Technology Research Institute jointly released the “China Big Data Industry Development Report 2021–2022”, pointing out that the big data industry will maintain an average annual growth rate of 12% from 2023–2025, by 2025, the talent gap in the big data industry will reach more than 2.3 million. Under this realistic situation, colleges and universities should, from the perspective of the economic

development of the national AI industry and the demand for post talents in enterprises, formulate the education system and curriculum teaching plan for the training of big data professionals, closely follow the development orientation and post requirements of big data-related majors, and innovate the curriculum teaching objectives, teaching contents, teaching methods, application practices and interactive modes for the training of big data professionals, we will continue to promote the integration of big data and artificial intelligence technology to solve the problem of “integration of theory and practice” of big data professional education and AI industry needs [1].

## II. THE DEVELOPMENT DIRECTION OF TECHNOLOGY AND EDUCATION INVOLVED IN BIG DATA PROFESSIONAL COURSES UNDER AI CONCEPT

### A. Main Technologies Involved in the Education of Big Data Major Courses

In response to the national big data development strategy, the implementation of big data professional curriculum education in domestic colleges and universities in recent years usually selects teaching materials such as “Introduction to Big Data Technology”, “Principles and Applications of Big Data Technology”, “Hadoop Big Data Technology and Applications”, “Database System Tutorial” and “Big Data Privacy and Security” as the main educational contents, and organizes educational and teaching activities for students majoring in big data application and artificial intelligence, it involves big data mining and analysis technology, wireless sensing and recognition technology, artificial intelligence technology and other technical content [2].

(1) Big data mining and association analysis techniques Teaching materials such as “Principles and Applications of Big Data Technology” and “Hadoop Big Data Technology and Applications” mainly focus on big data mining and analysis technology, and propose big data mining schemes for object-oriented databases, relational databases, temporal and spatial databases, including mining methods based on decision tree machine learning algorithm, MapReduce k-means clustering algorithm, BP neural network algorithm, etc., which can face the massive

data information transmission of WAN and LAN, extract, mine and analyze network log data from the background database to provide support for the investigation and early warning of network security attacks and network alarm events [3].

(2) *Wireless sensing and identification technology*

Facing the actual needs of intelligent industrial or agricultural production and intelligent network communication, big data professional courses introduce intelligent sensor perception and wireless sensor network communication technologies, including Bumblebee binocular high-speed cameras, VR glasses, RFID radio frequency identification devices, smart watches, network routers, network switches and other software and hardware technologies, which can introduce students to the implementation methods of environmental data perception monitoring, target object tracking and identification [4].

(3) *Artificial intelligence technology*

Facing the development direction of 5G mobile communication and artificial intelligence interaction in the era of interconnection of all things, some colleges and universities have tried to integrate big data professional courses and artificial intelligence technology courses to teach software and hardware technologies related to 5G LTE-V core network, 5G network communication frequency band, wireless router, PAN coordinator, NFV/MANO virtual server, SLAs service protocol, GBM machine learning algorithm, and deep neural network algorithm, this paper discusses the direction of the integration and development of big data mining, association analysis technology, and artificial intelligence technology, and guides students to participate in the experimental process of 5G communication networking, intelligent perception, and data processing [5].

*B. The Educational Development Direction of Innovative Talents Training in Big Data Specialty*

The training direction of innovative talents and comprehensive quality talents of big data specialty in the new era usually needs to start from the educational perspective of cross-integration of knowledge of different disciplines, and combine the contents of teaching materials such as "Introduction to Big Data Technology", "Principle and Application of Big Data Technology" and "Hadoop Big Data Technology and Application, integrate the teaching contents of big data mining and analysis, wireless perception and identification technology, 5G communication technology and artificial intelligence technology inside and outside the class, carry out all-round training of students' mathematical logical thinking, big data mining ability, big data processing and analysis ability, big data and artificial intelligence integration and application ability, etc., and enhance students' innovative thinking and big data practice ability in AI communication and intelligent industry application environment, and then achieve the goal of interdisciplinary quality education and innovation ability education in big data specialty.

**III. DEFICIENCIES IN THE CURRICULUM SYSTEM AND TEACHING WORK OF BIG DATA MAJOR IN COLLEGES AND UNIVERSITIES**

*A. Big Data Professional Curriculum Education Objectives, Teaching System Is not Scientific and Perfect*

Based on the development background of big data, cloud computing, and artificial intelligence industry, the professional courses of big data in colleges and universities should start from the aspects of teaching material outline and the demand of talents for practical application of enterprises, and establish an education system corresponding to the transmission of basic theoretical knowledge and the demand of social posts, so as to ensure the realization of the goal of comprehensive quality personnel training of big data major [6].

However, although some colleges and universities offer courses related to big data major at present, they only set up curriculum education objectives and teaching tasks for examination-oriented courses based on the principles of big data technology and the syllabus of teaching materials for the application of big data major, and do not aim at the application direction of big data major in finance, transportation, industrial manufacturing, agricultural industry, smart home, intelligent logistics, etc., construct a complex and dynamic "1 + X" talent training teaching system, ignoring the practical teaching design related to the application of big data technology and artificial intelligence technology [7]. The current situation of this course education reflects that college teachers have unclear positioning of big data major and have not updated their own teaching concepts with the times, which makes the educational ecology of big data major courses in AI environment single and insufficient integration, leading to the dislocation of students' knowledge learning and professional application needs of big data courses.

*B. The Outdated Teaching Theory and Teaching Case Selection of Big Data Major Courses*

Facing the application requirements of big data interdisciplinary subjects, the selection and setting of teaching knowledge content and practical cases of big data professional courses should also be timely introduced into the teaching theories of big data correlation analysis technology, wireless sensor network technology, artificial intelligence technology, mining and analysis algorithm, and case explanation should be carried out in combination with specific practical application directions to improve the teaching efficiency and education quality of big data professional courses, however, most colleges and universities have not yet achieved the interdisciplinary integration teaching of big data major.

Especially limited by the lack of national financial support and professional teaching staff, although some colleges and universities also respond to the requirements of the national new curriculum reform standard and introduce relevant professional teaching materials such as big data Python Scrapy crawler, big data mining, big data analysis and processing to enrich and perfect the

theoretical knowledge system of big data professional courses, most colleges and universities have not constructed a multi-disciplinary practical training practice platform, the choice of big data teaching cases is mainly based on teaching materials, and the lack of project practice case teaching for the needs of enterprise positions makes it difficult to ensure students' learning of the latest professional knowledge and mastery of practical skills [8].

### C. *Inadequate Innovation in the Teaching and Practical Models of Big Data Courses both in and out of Class*

In recent years, the teaching activities of practical training for big data major courses in colleges and universities have begun to make full use of digital means such as online massive open online course, micro-class, flip class, and PPT demonstration courseware to carry out online education of unit teaching theme demonstration and practical case guidance. However, even so, the practical teaching for big data major is still mainly based on teaching material case design, and the open experimental training projects related to school-enterprise integration and innovation and entrepreneurship teaching are insufficient.

Under the goal of training and education for big data's comprehensive quality talents, some colleges and universities lack a teaching team of "double post rotation and double qualification". For the theoretical knowledge of big data professional courses and the case teaching of project practice, the "order form" talent training mode jointly built by schools and enterprises is rarely implemented. In the practical teaching of big data mining and analysis technology, wireless sensor network technology and artificial intelligence technology, it is not possible to provide "one-to-one" and "one-to-many" interactive guidance for different students in time, so it is difficult for students to get sufficient post practice and project business practice. Instead, they expect to get the opportunity of big data professional practice through campus recruitment.

## IV. RESEARCH ON THE IMPROVEMENT STRATEGY OF THE CURRICULUM SYSTEM AND TEACHING MODE OF INNOVATIVE TALENTS TRAINING IN BIG DATA SPECIALTY UNDER THE CONCEPT OF AI

### A. *The Construction of "1 + X" Course Teaching System and Teaching Objectives for the Integration of Big Data Major Disciplines*

Since 2016, General Secretary Xi has pointed out in many meetings: "What kind of people to train, how to train people, and for whom are the top priorities of talent training". The teaching of big data professional courses under the concept of AI industry integration and development should follow the development direction of comprehensive quality talents and practical applied talents, and construct the "1 + X" discipline integration teaching system of big data professional courses, according to the application directions of big data collection, cleaning, mining and analysis of different disciplines or industries,

set up a systematic teaching system of big data professional theory compulsory courses, big data mining analysis elective courses, wireless network perception and communication elective courses, machine learning algorithm analysis elective courses, artificial intelligence interactive elective courses [9]. University teachers establish two educational development directions: teaching task transmission and vocational skill certificate training. According to the unit project themes of big data professional courses and practical cases inside and outside the class, they organize and design theoretical and practical teaching processes for Web software front-end development, intelligent Internet of Things development, big data platform operation and maintenance, AI environment dynamic perception and interaction, the situation guidance and demonstration teaching of big data technology application for students of different majors are carried out to help students complete the practical learning of big data information resource mining, big data technology and service application.

### B. *Set up the Teaching Theory and Teaching Case Content of Big Data Professional Courses for Job Needs*

Under the guidance of the teaching concept of "AI integration" for big data major, colleges and universities can cooperate with local big data enterprises and artificial intelligence enterprises to formulate collaborative education goals for job needs, establish a "school-enterprise integration" training practice platform for big data major courses, and carry out targeted teaching for students of different related majors and different learning levels. First of all, in response to the requirements of the national big data development strategy, colleges and universities should apply to their superiors for the construction and development funds of big data professional education, and build a "double-qualified" teaching team with big data theory teaching experience and project practice ability. on this basis, formulate a scientific standardized and systematic teaching knowledge system.

Secondly, in the process of organizing and integrating the teaching theoretical knowledge and teaching case contents of big data major courses, teaching materials such as "Principles and Applications of Big Data Technology", "Database System Tutorial", "Big Data Privacy and Security" and "Big Data Operation and Maintenance" can be focused on, as well as AI practical application directions of software development and programming, machine learning and human-computer interaction, design the systematic teaching content of mathematical statistics, big data analysis and machine learning algorithm, strengthen the two-way curriculum education of theory guiding practice and practice mapping theory, deepen the theoretical perception of big data and integrate practical teaching of students of different majors, so as to cultivate students' ability of big data network operation and post practice.

### C. Innovation of Teaching Mode, Teacher-Student Practice and Interaction Mode of Big Data Major Courses

In order to realize the comprehensive connection between the teaching of big data professional courses and the application practice of enterprise industry, the education management department of colleges and universities should deepen the cooperation of big data professional education and open the organization of practical activities through the joint construction of schools and enterprises and the construction of practical training bases, innovate the existing teaching mode of subject courses, teacher-student problem interaction and practice mode, and guide students of different majors to carry out the comprehensive study of big data professional theory courses and computer experimental training courses, make it truly master the skills of big data software tool application and big data information resource collection and use.

Through the mixed course teaching mode of “online massive open online course + PPT courseware demonstration + offline teaching class” and the integrated teaching of production and teaching in the school-enterprise practical training base, a comprehensive teaching mode of “online online + offline guidance + school-enterprise practical training” is jointly created. For example, in recent years, many enterprises in Suzhou Industrial Park have cooperated with local universities to form a school-enterprise industrial alliance, launching “apprenticeship” big data professional training [10]. 5G network communication technology, AI intelligent wearable equipment, ERP information management system, background server and other software and hardware are introduced to create a perceptual experience situation for the teaching of big data major courses. Teachers lead students to participate in the practice of big data mining analysis and artificial intelligence technology development and application, and recognize and understand the technical requirements of big data related positions and the demand for employment and entrepreneurship talents, in the process of multiple computer operations, teacher-student problem interaction and exploration of big data projects, students’ big data information mining ability, big data software development and interactive application ability are improved.

### V. CONCLUSION

Facing the demand for big data talents in the fields of intelligent industrial manufacturing, intelligent transportation, intelligent network communication, smart home, automated agricultural production, etc., the design and improvement of the curriculum system and teaching mode of innovative talents training for big data majors in colleges and universities also need to focus on the “big data” AI “industry development concept to make

innovations in teaching knowledge system, theory, and practical teaching methods. According to the demand for innovative talents in big data majors in different industries, a “1 + X” open teaching system integrating big data teaching materials, related subject teaching materials, and practical training practices inside and outside the class is set up. Double-qualified teachers will carry out mixed education of “online massive open online course + PPT demonstration + offline teaching”, innovate the practical operation guidance and interactive teaching mode of big data professional courses, and achieve the training goal of innovative talents in big data majors.

### CONFLICT OF INTEREST

The author declares no conflict of interest.

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